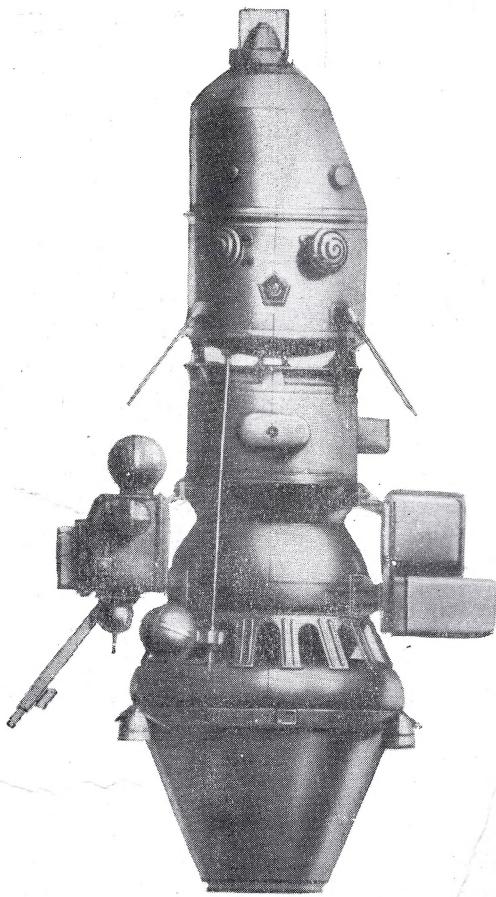




ACADEMY OF SCIENCES
OF THE USSR



AUTOMATIC STATION «LUNA-10»—
FIRST ARTIFICIAL MOON SATELLITE

THE LAUNCHING of the first artificial Moon satellites to a near-lunar orbit was a new stage in the exploration of the Moon. The «Luna-10» automatic station, launched on April 3, 1966, was the first of them.

The beginning of the flight of the «Luna-10» Moon probe was similar to that of other lunar stations. It was initially placed into a near-terrestrial orbit and was then transferred to a trajectory of flight leading to the Moon. But the trajectory of flight was not aimed at a definite spot on the Moon's surface, but at a point of 1000 km off the Moon.

The trajectory of flight of this space station consisted of a part of flight in the sphere of action of the Earth, where the gravitational attraction of the Earth is stronger than that of the Moon, and of a part of flight where, vice versa, the gravitational attraction of the Moon prevails.

The Moon mass is considerably smaller than that of the Earth and that is why the sphere of action of the Moon is smaller than the sphere of action of the Earth. The sphere of action of the Moon extends to some 60 000 to 70 000 km from its centre and lies, generally speaking, within the sphere of action of the Earth. When the artificial satellite of the Earth was launched from the intermediate orbit, the booster provided to the «Luna-10» automatic station a speed of about 10.87 km/sec.

The time of flight to the Moon was slightly in excess of 72 hours at such initial speed. When the automatic station entered the sphere of effect of the Moon it had a speed of about one kilometre per second with respect to the Moon. A correction of the trajectory was carried out in accordance with the radiomeasurements to place the station

into the prescribed near-lunar orbit. The command for the correction was given from the Earth during one of the communication periods.

Moving in accordance with the celestial mechanics laws, the station acquired a speed of about 2.1 kilometres per second near the Moon. The station would have passed the Moon and become the satellite of the Earth if that speed had not been decreased. It was necessary to reduce the station's flight speed to about 1.25 km/sec at some point of the near-lunar space, determined in advance, to put the «Luna-10» automatic station into a near-lunar orbit and to make it a satellite of the Moon.

Those conditions were ensured by a special radio system of measurements and an appropriate complex of rocket's flight control.

The reduction of the station's speed ensured its transfer to the orbit of an artificial Moon satellite with the maximum distance from the Moon's surface of about 1000 km and with the minimum distance from the Moon's surface of about 350 km, and with the revolution period of about 3 hours.

The «Luna-10» automatic station consisted of the two following main parts: the artificial Moon satellite which was put into the near-lunar orbit, and the propulsion system with the instrument compartment.

The artificial Moon satellite was a hermetically sealed container weighing 245 kg, which housed the following devices:

- radio instruments, telemetric system, programming-timing devices;
- scientific instruments for the study of the Moon and of the near-lunar space;
- thermocontrol system;
- antennae devices;
- power supply sources.

The propulsion system of the automatic system consisted of a liquid-propellant rocket engine, fuel tanks, fuel supply system and control devices, necessary for the stabilisation of the station in the flight during the operation of the engine.

The weight of the «Luna-10» automatic station was 1600 kg when it was put into the trajectory of flight towards the Moon.

The «Luna-10» space station was equipped with a large quantity of scientific instruments for the specification of the value of the possible magnetic field of the Moon, for the study of the chemical composition of its surface, the radiation in the near-lunar space and for a number of other purposes.

The sputnik functioned until May 30, 1966, and made 460 revolutions around the Moon during that period.

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